

**Course Syllabus and Lesson Plan**  
**SCID 324**  
**Medical Genetics**  
**Academic Year 2010**

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**Course Code:** SCID 324  
**Course Name:** Medical Genetics  
**Total Credit:** 2 (2-0)  
**Prerequisite:** SCID 141  
**Duration:** 2-3 weeks (30 August - 13 September, 2010)

**Course Description**

ความรู้พื้นฐานเกี่ยวกับยีน โครโมโซม การแสดงออกและถ่ายทอดลักษณะทางพันธุกรรม โครงสร้างลักษณะ การเรียงตัวและการแสดงออกของยีนบนโครโมโซม ความหลากหลายความผันแปรและการคัดเลือกพันธุกรรมโดยธรรมชาติ ชนิดของการเลือกและปัจจัยทางวิวัฒนาการของมนุษย์ การกลายของสารพันธุกรรม การทำแผนที่ยีนของมนุษย์ เทคนิคในการวินิจฉัยโรคพันธุกรรมในระดับโมเลกุล กลไกการเกิดโรคพันธุกรรมระดับชีวเคมีและชีววิทยาระดับโมเลกุล โรคที่เกิดจากความผิดปกติของการถ่ายทอดทางพันธุกรรมแบบธรรมดาและแบบซับซ้อน การเกิดมะเร็งในระดับโมเลกุล การรักษาโรคพันธุกรรม ความรู้ทางวิทยาการระบาดในการป้องกันและรักษาโรค การให้คำปรึกษาทางพันธุศาสตร์แก่ผู้ป่วย จรรยาบรรณของการทำวิจัยในมนุษย์

Fundamental concepts of genes, chromosomes, gene expression and their inheritance, features of human genome, organization, expression and regulation of genes on chromosomes, genetic variation, polymorphism and natural selection, types of selection and factors affecting human evolution including genetic mutations, mapping of human genome, molecular tools for analysis of genetic diseases, biochemical mechanism and molecular biology of genetic diseases of both single gene and multi-factorial disorders, carcinogenesis at the molecular level, treatment of genetic diseases, epidemiological study for prevention and therapy, genetic counseling and ethical conduct involving human research

**Course Overview**

Medical genetics is an integrated course that links between basic sciences and medical sciences with certain elaboration on selected clinical-related topics. Teaching modalities include lectures, demonstrations, panel discussion and small group discussion. Lecture part provides basic concepts on human genetics ranging from fundamental to genes and chromosomes, feature of human genome, organization and expression of genes, repetitive sequences and multi-gene family, genetic variations, polymorphisms and gene evolution, gene mutations and diseases, the human genome project, principles of genetic diseases and inheritance, genetic concepts in human genetic diseases including cancer, DNA diagnosis, therapeutic interventions, pharmacogenomics, prevention, to genetic counseling. Laboratory demonstrations on disease diagnosis and patients' information magnify the understanding of human genetic diseases. Panel discussion and small group discussion on certain important issues create active learning emphasizing students' participation and learning process. Lecturers are from Faculty of Science, Faculty of Medicine and Faculty of Social Science.

**Course Design Group Faculty****Course Co-ordinators:**

1. Mathurose Ponglikitmongkol, Biochemistry, Faculty of Science
2. Jakris Eu-ahsunthornwattana Medicine, Faculty of Medicine Ramathibodi Hospital

**Course committee:**

1. Mathurose Ponglikitmongkol
2. Jakris Eu-ahsunthornwattana
3. Budsaba Rerkamnuaychoke
4. Ampaiwan Chuansumrit
6. Thanyachai Sura
7. Duangrurdee Wattanasirichaigoon
8. Jamorn Somana
9. Orathai Arampongpan
- 10 Porntip Supawilai
- 11 Pornpimol Rongnoparat

**Teaching Staff:****Faculty of Science**

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|-------------------------------|--------------|
| 1. Mathurose Ponglikitmongkol | Biochemistry |
| 2. Wilai Noonpakdee           | Biochemistry |
| 3. Panskorn Tanratana         | Pharmacology |

**Faculty of Medicine Ramathibodi Hospital**

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|------------------------------------|---------------------------|
| 1. Budsaba Rerkamnuaychoke         | Pathology                 |
| 2. Ampaiwan Chuansumrit            | Pediatrics                |
| 3. Duangrurdee Wattanasirichaigoon | Pediatrics                |
| 4. Suradej Hong-eng                | Pediatrics                |
| 5. Thipwimon Timarun               | Pediatrics                |
| 6. Patama Promsonthi               | Obstetrics and Gynecology |
| 8. Atchara Tunteeratum             | Medicine                  |
| 9. Jakris Eu-ahsunthornwattana     | Medicine                  |
| 10. Objoon Trachoo                 | Medicine                  |
| 11. Thanyachai Sura                | Medicine                  |

**Course Objectives****After the course, the students should be able to**

1. Describe fundamental knowledge in human genetics, role of genes and their products in pathogenesis
2. Explain tools for analysis of genetic disorders
3. Discuss the applications of genetic information in disease prevention, prenatal diagnosis, therapy, and common ethical issues

**Course Organization**

1. Lecture (26 hr)
2. Panel discussion (2 hr)
3. Small Group Discussion (2 hr)
4. Questions and answers (4 h)

**Recommended Textbooks**

1. Thompson & Thompson *Genetics in Medicine* 7<sup>th</sup> edition 2007 Sanders
2. Ricki Lewis *Human Genetics: Concepts and Applications* 7<sup>th</sup> edition 2007 McGrawhill
3. Robert F. Mueller and Lan D. Young Emery's *Elements of Medical Genetics* 12<sup>th</sup> edition 2005 Churchill Livingstone Harcourt Publishers Ltd.

**Recommended websites**

Online Mendelian Inheritance in Man <http://ncbi.nih.gov/omim/>

**Student Assessment**

Written examination	75%
Class participation	10%
Small group conference	15%

Week 1	Monday 30 Aug 10	Tuesday 31 Aug 10	Wednesday 1 Sep 10	Thursday 2 Sep 10	Friday 3 Sep 10
8.30-9.00	<b>Orientation</b>				
9.00-9.30	<b>Lec 1:</b> (1.5) From DNA to phenotype (Mathurose)	<b>Lec 4:</b> (1.5) Cytogenetics and chromosome disorders (Budsaba)	<b>Lec 7:</b> (1.5) Principle of genetic diseases and inheritance (Atchara)	<b>Lec 9:</b> (1.5) Human genetic diseases I: Metabolic disorders and mitochondrial diseases (Duangrurdee)	<b>QA 1:</b> (2.0) Budsaba, Mathurose, Wilai, Jakris, Atchara
9.30-10.00					
10.00-10.30					
10.30-11.00	<b>Lec 2:</b> (1.5) Human genome organization and application (Wilai)	<b>Lec 5:</b> (1.5) Applications in forensic medicine (Budsaba)	<b>Lec 8:</b> (1.5) Population genetics and genetic linkage (Jakris)	<b>Lec 10:</b> (1.5) Prevention and counseling (Duangrurdee)	<b>Lec 12:</b> (1.5) Common genetic diseases in Thailand I: Adult (Objoon, Thanyachai)
11.00-11.30					
11.30-12.00					
LUNCH					
13.00-13.30	<b>Lec 3:</b> (1.5) Genetic polymorphism and diseases (Mathurose)	<b>Lec 6:</b> (1.5) DNA diagnosis and applications (Mathurose)		<b>Lec 11:</b> (1.5) Human genetic diseases II: Thalassemia and hematologic diseases (Ampaiwan)	
13.30-14.00					
14.00-14.30					
14.30-15.00					
15.00-15.30					

Week 2	Monday 6 Sep 10	Tuesday 7 Sep 10	Wednesday 8 Sep 10	Thursday 9 Sep 10	Friday 10 Sep 10		
08.30-9.00							
9.00-9.30	Lec 13: (1.5) Common genetic diseases in Thailand II: Pediatric (Thipwimon)	Lec 15: (1.5) Human genetic disease IV: Neoplasm and cancer (Mathurose)	Group Conference: (2.0) Genetic counseling/ ethical conduct: case study, Budsaba, Jakris, Duangrurdee, Mathurose, Patama, Wilai, Thipwimon, Objoon, Thanyachai, Atchara, Pansakorn	QA 2: (2 hr.) Jakris, Duangrurdee, Mathurose, Suradej, Thanyachai, Objoon			
9.30-10.00							
10.00-10.30							
10.30-11.00	Lec 16: (2.0) Therapeutic approach & Pharmacogenetics (Suradej, Objoon Thanyachai.)						
11.00-11.30							
11.30-12.00							
	Lec 14: (1.5) Common genetic diseases in Thailand III: Polygenic & Multifactorial (Jakris)						
LUNCH							
13.00-13.30	Panel 1: (2.0) Approach to genetic cases (Thanyachai, Jakris, Objoon)	Special lecture: (1.5) Medical ethics (Chaichana)	Group Conference: (2.0) Genetic counseling/ ethical conduct: case study (Ampaiwan, Suradej)				
13.30-14.00							
14.00-14.30							
14.30-15.00							
15.00-15.30							

<b>Week 3</b>	<b>Monday 13 Sep 10</b>	<b>Tuesday 14 Sep 10</b>	<b>Wednesday 15 Sep 10</b>	<b>Thursday 16 Sep 10</b>	<b>Friday 17 Sep 10</b>
9.00-9.30	Exam SCID 324 09.00-11.00: L01, 04, 05, MDL 1, 2 (Jakris, Mathurose)				
9.30-10.00					
10.00-10.30					
10.30-11.00					
11.00-11.30					
11.30-12.00					
LUNCH					
13.00-13.30					
13.30-14.00					
14.00-14.30					
14.30-15.00					
15.00-15.30					

